UNIT 2

Changes in the Seasons

How living things change during the year.

SPRING
New life begins.

SUMMER
Plants grow and thrive.

AUTUMN
Leaves change color and fall.

WINTER
Cold days. Some plants rest.

Seasons change, and living things change with them.
Observing these changes helps us understand the world around us.

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Changes During the Year

Lesson 2.1

- Plants are affected by the seasons of the year.
- Plants have a life cycle just like humans.

Life Cycle of the Loofah Plant

1. Seed germination
2. New plant growth
3. Flowering and fruiting
4. Fruits develop
5. Seeds form (plant wilts / dies)

Plant Life Cycle

- A human has a life cycle that starts at **birth**, passes through **childhood** and **youth**, then **old age**, and ends with **death**.
- Plants also have a life cycle that begins with **germination** (the seed sprouts), then **growth** (a new plant forms), then **flowers** and **fruits** develop, and **seeds** form, until the plant **wilts (dies)**.

Annual Plants

Annual plants are plants that complete their whole life cycle in only **one** growing season (**one year**).

Examples of Annual Plants

1. Loofah plant
2. Tomato plant

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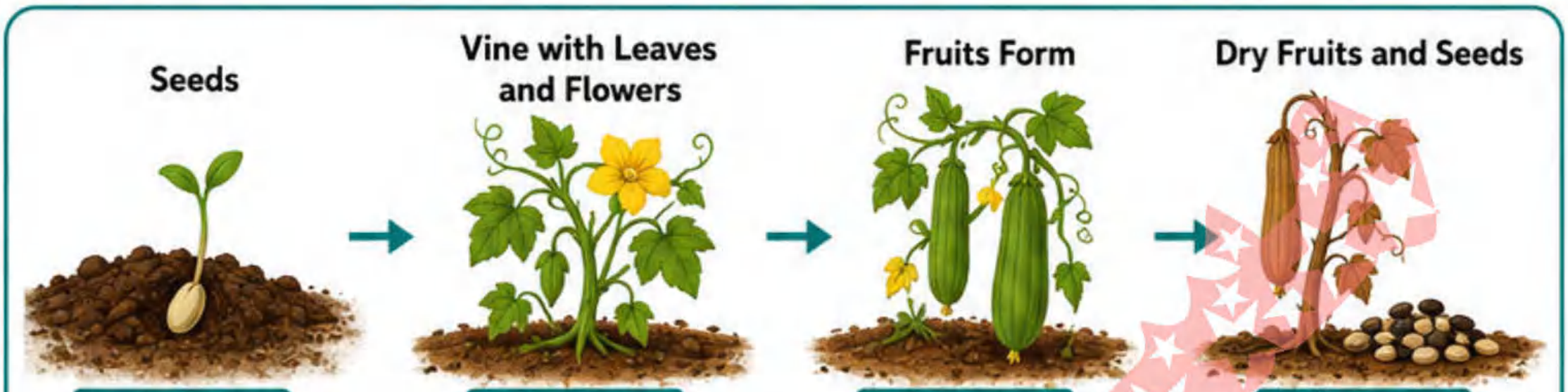
The Annual Cycle of Plants

How plants change through the seasons

The annual cycle of a plant is the clear change in the appearance of the plant according to temperature changes during the different seasons of the year.



Loofah Plant Through the Seasons

In summer (high temperature): germination begins, the stem grows, leaves spread on the plant, flowers open, and fruits and seeds form.

In winter (low temperature): the plant begins to wilt, the fruits dry and turn brown, and new seeds form for the next generation.

Next generation: the new seeds wait for warmth (the next summer) and suitable conditions to grow and start a new life cycle.

Annual Cycle of Loofah and Tomato Plants

Season	Temperature	Loofah Plant	Tomato Plant
Summer	High	Seeds germinate, stem grows, leaves spread.	Flowers appear and green fruits begin to form.
Autumn	Moderate	Fruits turn brown.	Fruits turn red.
Winter	Low	Fruits wither and new seeds form.	Fruits wither and new seeds form.
Spring	Moderate	A new life cycle begins and germination starts.	A new life cycle begins and germination starts.

The life cycle of annual plants does not truly end with the death and wilting of the plant. It repeats when the new seeds germinate and continue the life cycle in the following year.

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Animals and Temperature

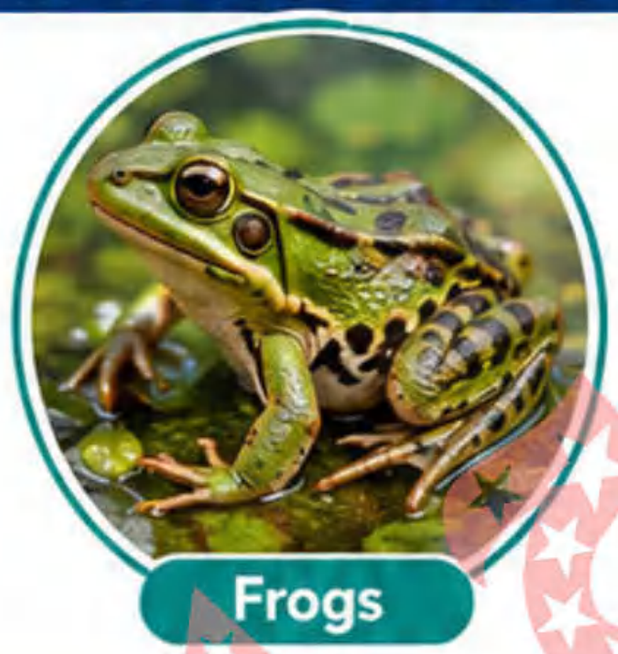
How temperature affects animal activity

MAIN IDEA

The seasons affect the **movement, activity, and behavior** of animals because the activity of these animals depends on **temperature** during the different seasons of the year.

Examples of animals whose activity is affected

Lizards



Frogs

Snakes

In Warm Seasons (high temperature)

- Animals grow and reproduce.
- Many animals become active and move quickly to search for food or escape danger.

In Cold Seasons (low temperature)

Animals adapt to the cold weather in different ways.

1 Inactivity (Dormancy)

Animals become inactive and stay in safe places.

2 Hibernation

Animals sleep for a long time to save energy.

3 Migration

Animals move to warmer places where food and water are available.

These are ways animals **adapt** to cold weather.

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LESSON 2.2

How Animals Adapt to Cold Weather

1 Inactivity (Dormancy)

Animals become inactive when the temperature decreases because the coldness of their bodies prevents fast movement, so they move slowly or do not move much.

Inactivity is the slowing down of an animal's movement, or not moving much.

2 Hibernation

Animals resort to hibernation when the temperature drops greatly:

1. to conserve their energy because food is not available, and
2. until the weather becomes better and the temperature rises.

That is why lizards and frogs disappear in winter: they enter hibernation.

Hibernation is when some animals hide in the soil or in cracks of rocks during the cold winter season.

3 Migration

Some animals, especially birds, leave their homeland and migrate to warmer places.

- **Famous birds that migrate to Egypt:** ducks, quails, flamingos.

These birds come to Egypt in winter and return to their homeland in spring when the weather improves.

Many lizards are seen on hot rocks under the sun in summer because the high temperature gives them **warmth and energy**.

They become more **active** and move to search for food or escape danger.

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Animal Activity Through the Seasons

SPRING
New life begins.

SUMMER
Animals become active and search for food.

AUTUMN
Some birds migrate; animals resort to inactivity.

WINTER
Animals enter hibernation.

Note: Humans can move actively even when the weather is cold, while lizards are affected by temperature.
Reason: Humans can keep their body temperature constant at 37°C, but the body temperature of lizards changes according to the temperature of the environment.

Plant Activity and Animal Activity Through the Seasons

Season	Plant Activity	Animal Activity
Summer	Plants flourish; flowers and fruits appear.	Animals become active in movement; animals go out to search for food.
Autumn	Fruits ripen; leaf color changes.	Some birds migrate; animals resort to inactivity.
Winter	Plants wilt; new seeds form for the next year.	Animals enter hibernation.
Spring	Seeds begin to germinate; the stem grows and leaves spread.	Animals come out of hibernation; migratory birds return to their original homeland.

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Desert Wisdom

The Fennec Fox and Traditional Clothing

1 Fennec Fox

The fennec fox is the smallest fox in the world. It lives in the very hot desert.

It has a great ability to adapt to temperature changes and control its body heat.

Adaptations of the Fennec Fox

1	It has very large ears compared with its small body.	**Reason:** They help it get rid of body heat.
2	A fine network of blood vessels spreads under the skin of the ears.	**Reason:** Its body cools easily when warm blood reaches the ears and desert wind blows over them, like an air conditioner.
3	It has long hair under its feet, like socks.	**Reason:** This forms a barrier that protects its feet from the hot desert sand.

2 Traditional Clothing

The jalabiya is a traditional item of clothing in Egypt. It is common in rural Egypt, Upper Egypt, and also in the Egyptian desert.

The design of the jalabiya works by using air movement because there is a wide space between the jalabiya and the person's body. When the cloth becomes warmer, the air inside becomes lighter and rises upward. New air enters from below and circulates, helping sweat evaporate faster and cooling the body.

Color and Heat

The white color of the jalabiya reflects the sun's rays, reduces heat, and helps dry sweat.

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Lesson Summary – Part 1

1 PLANT LIFE CYCLE

Germination → New plant forms → Flowers open → Fruits form → Seeds form

2 ANNUAL PLANTS

Annual plants complete their whole life cycle in one year.

Examples:

loofah

tomato

The life cycle of the plant does not end permanently with wilting. It repeats when new seeds germinate in the following year.

3 ANNUAL CYCLE OF LOOFAH AND TOMATO PLANTS

Season	Temperature	What happens?
Summer	High temperature	Seeds germinate, stem grows, leaves spread, flowers appear.
Autumn	Moderate temperature	Loofah fruits turn brown; tomato fruits turn red.
Winter	Low temperature	Fruits wither and new seeds form.
Spring	Moderate / warm temperature	A new life cycle begins and germination starts.

ANIMAL ACTIVITY AND TEMPERATURE

Animal movement and activity are affected by changes in temperature during the different seasons of the year.

Examples:

Lizards, frogs, and snakes hibernate in winter.

5 WAYS ANIMALS ADAPT TO COLD WEATHER

Inactivity

Migration

Hibernation

6 Animals resort to inactivity when the air temperature decreases because the coldness of their bodies prevents fast movement.

7 Animals resort to hibernation when the air temperature decreases to conserve energy because food is not available and until the weather improves.

8 Animals migrate from their homeland to warmer places.

Examples of birds that migrate to Egypt: ducks, quails, flamingos.

Inactivity: slowing down movement or stopping movement almost completely.

Hibernation: some animals hide in the soil or in cracks of rocks during the cold winter.

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Lesson Summary – Part 2

1 Plant Activity and Animal Activity Through the Seasons

Season	Plant Activity	Animal Activity
SPRING	Plants—seeds begin to germinate, the stem grows, and leaves spread.	Animals—animals come out of hibernation, and migratory birds return to their original homeland.
SUMMER	Plants—plants flourish, and flowers and fruits appear.	Animals—animals become active in movement and go out to search for food.
AUTUMN	Plants—fruits ripen, and the color of leaves changes.	Animals—birds migrate, and animals resort to inactivity.
WINTER	Plants—plants wilt and produce new seeds for the next year.	Animals—animals enter hibernation.

2 Key Concept

- **Humans** can move actively even when the weather is cold because humans can keep their body temperature constant.
- **Lizards** are affected by the temperature of the weather because their body temperature changes according to the surrounding environment.

3 Quick Facts Recap

- **The fennec fox** is the smallest fox in the world and is called the desert hunter.

- **Adaptations of the fennec fox:** large ears, a fine network of blood vessels in the ears, and long hair under the feet.

- **The Egyptian jalabiya** has features that make it suitable for hot environments: it is wide, loose, and white, which helps reduce heat and cool the body.

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موقع الدكتور محمد رزق
Dr.MoRizK